NASA Procedural Requirements

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Subject: NASA Environmental Management System (EMS) w/Change 2 (04/26/2006)

Responsible Office: Environmental Management Division

| TOC | Change_History | Preface | Chapter1 | Chapter2 | Chapter3 | Chapter4 | Chapter5 | Chapter6 | Chapter7 | AppendixA | AppendixB | AppendixC | AppendixZ1 | AppendixZ2 | AppendixZ3 | AppendixZ4 | ALL |

Chapter 3. Planning

3.1 Environmental Aspects and Impacts

3.1.1 Purpose. To identify priority environmental aspects and impacts essential to developing NASA's EMS.

3.1.2 Roles and Responsibilities

3.1.2.1 NASA Headquarters Environmental Management Division is responsible for --

a. Establishing NASA EMS priority environmental aspect risk criteria.
b. Defining the scope of the NASA EMS and supporting the definition of the scope of the Headquarters EMS.
c. Collection and review of environmental information from Centers and providing an overview and recommendations to the Mission Directorates and Mission Support Offices, as appropriate, for use in the Headquarters EMS.3.1.2.2 NASA Mission Directorates and Mission Support Offices are responsible for --

a. As appropriate, applying steps a. through d. in Chapter 3.1.2.3 below, to the activities, products, and services e.g., grants, of the Mission Directorate or Mission Support Office, within the scope of the Headquarters EMS.
b. Reviewing environmental information provided by Centers and, where appropriate, considering environmental impact categories and environmental aspect risk criteria to define Headquarters high priority environmental aspects for the Mission Directorate or Mission Support Office.Working with Headquarters Environmental Management Division to define the scope of the Headquarters EMS.

3.1.2.3 NASA Centers are responsible for --

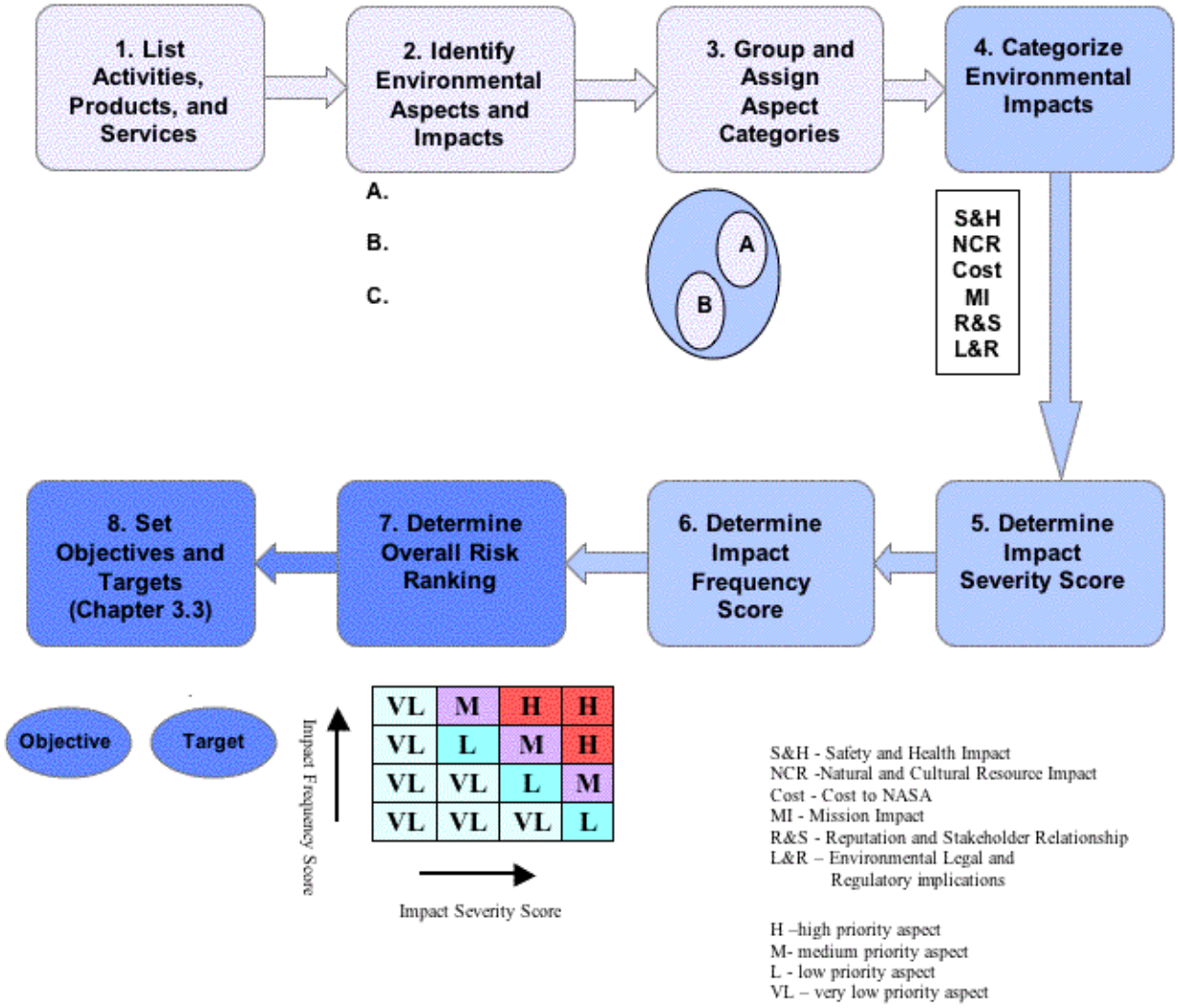
a. Identifying and documenting Center activities (past, present, and future), products, and services within the scope of the Center EMS.
b. Identifying and documenting the environmental aspects and associated environmental impact(s) of the documented activity, product, or service.
c. Applying EMS environmental aspect risk criteria.
d. Periodically reviewing and updating the results of steps a. through c. above.

3.1.3 Requirements

Centers shall follow each of the steps described below. Center employees are expected to apply best professional judgment when applying this process.

The following diagram and notes illustrate the recommended order of steps for this process. Centers may modify the order of steps 1 to 3 but shall complete all steps.

Flow Diagram of Overall Process for Identifying Environmental Aspects and Impacts and Determining High-Priority Environmental Aspects



Flow Diagram Notes:

In steps 1 to 3, a list of environmental aspects is developed and they are grouped into categories.

Once environmental aspects have been categorized, steps 4 to 6 assign applicable impact categories and associated impact severity and frequency.

To establish the level of priority for an environmental aspect, the risk associated with each associated environmental impact is defined in step 7, using a combination of the severity and frequency of the environmental impact.

3.1.3.1 Step 1: List all activities, products and services

Within the scope of its EMS, each Center shall identify all activities, products, and services under its control, as well those activities, products, and services over which it should be expected to have control pursuant to its mission, based on the nature and scale of its operations.

3.1.3.2 Step 2: Identify environmental aspects and impact(s)

a. Centers shall determine the environmental aspects and impacts associated with the activities, products, and services identified under step 1.
b. Past activities, products, and services with environmental impacts that potentially require management in the present or future shall be considered
c. Environmental impacts associated with activities, products, and services that are planned for the future with a reasonable degree of certainty shall be considered.
d. The identification of present and future environmental impacts shall consider normal, abnormal, and

emergency conditions.

1. Abnormal and emergency conditions that can be reasonably foreseen shall be considered.
2. Where separate environmental impacts have been identified based on consideration of normal, abnormal, and emergency conditions, each environmental impact shall be subject to steps 4 through 7 below.

e. Where environmental impacts or their severity or frequency (see steps 4, 5 and 6) vary depending upon different conditions, these variations may need to be considered as separate environmental impacts when conducting risk ranking, or the highest severity and frequency scores may be chosen.

3.1.3.3 Step 3: Group environmental aspects and impacts for manageability and assign environmental aspect categories

a. Where practical, Centers may group environmental aspects and associated environmental impacts to ensure that further analysis is manageable.
b. Each Center shall take the output from step 2, and any grouping that has been conducted, and assign environmental aspect categories as appropriate.

1. Where an environmental aspect and its associated environmental impacts may apply to more than one environmental aspect category, the environmental aspect category shall be selected based on best professional judgment.
2. The Center is free to determine in which category an individual environmental aspect belongs, but may not add or change the following list of twelve (12) environmental aspect categories. Examples of areas included in the environmental aspect categories are provided.

1	**Air Emissions**, including: Stationary and point sources Mobile sources Ozone depleting substances Fugitive emissions
2	**Fuel, oils, and lubricants**, including: Container storage Storage tanks Transformers Hydraulic systems Spill prevention control and countermeasures
3	**Hazardous materials**, including: Hazardous materials storage Emergency planning and response Community right-to-know
4	**Hazardous waste**, including: Collection and storage Hazardous waste treatment, storage and disposal facilities Off-site shipment and disposal State regulated industrial or chemically contaminated wastes
5	**Historical, Archaeological, and Cultural Resources**
6	**National Environmental Policy Act**, including: Environmental impacts Noise Environmental justice
7	**Natural resources**, including: Land use and resources Wetlands and floodplains Threatened and endangered species Wildlife Ecosystems Oceans and coastal zones
8	**Remediation/Restoration**, including: Comprehensive Environmental Response, Compensation, and Liability Act sites Resource Conservation and Recovery Act sites Tank sites
9	**Solid waste (non-hazardous),** including: General trash Construction waste Medical waste Solid waste landfills
10	**Sustainability**, including: Energy consumption Encroachment Facility construction, rehabilitation and modification Materials purchasing Water consumption
11	**Toxic substances,** including: Asbestos

	Lead paint Polychlorinated Biphenyls Pesticides/Herbicides Radioactive materials
12	**Water,** including: Drinking water Groundwater Storm Water Sanitary or Domestic Wastewater Industrial Wastewater Eutrophication

3.1.3.4 Step 4: Categorize environmental impacts

a. A high priority environmental aspect is a NASA environmental aspect that shall be managed to --

1. Avoid or prevent a serious adverse environmental impact, or
2. Create a substantial beneficial environmental impact.[2]

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[2] Within Federal Government agencies such as NASA, compliance with the National Environmental Policy Act (NEPA) requires that if "major actions" might impose "significant environmental impacts," then measures for mitigating these adverse impacts shall be identified and evaluated. To avoid confusion, the NASA EMS uses the term "priority" instead of "significant" when describing environmental aspects and impacts.

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b. Classify each individual or grouped environmental aspect by assigning associated environmental impacts into, as applicable, one or more of the following six categories:

1. Safety and Health (S&H).
2. Natural and Cultural Resources Impacts (NCR).
3. Cost to NASA (Cost).
4. Mission Impacts (MI)
5. Reputation and Stakeholder Relationships (R&S).
6. Environmental Legal/Regulatory Implications (L&R).

c. Both adverse and beneficial environmental impacts shall be considered within this framework.

Environmental Impact Categories

Note: The six categories described below encompass potential adverse and beneficial environmental impacts. Environmental impact descriptions denoted in the following with a - symbol are considered adverse environmental impacts. Environmental impacts denoted with a + symbol are considered beneficial environmental impacts.

Safety and Health Impacts (S&H)[3]	Score
- Potential source of death or disabling injury + Eliminate potential source of death or disabling injury	1
- Potential source of substantial injury/lost time or human health impact + Eliminate potential source of substantial injury/lost time or human health impact	2
- Minor injury or human health impact +Avoid minor injury or human health impact	3
-/+No injury or other health effect	4

Natural and Cultural Resources Impacts (NCR)[4]	Score
- Irreparable damage to natural or cultural resources + Prevents irreparable damage to natural or cultural resources + Results in expanded natural or cultural resources	1
- Substantial impact on protected natural or cultural resources + Prevents substantial impact on protected natural or cultural resources + Results in substantial restoration or conservation of/improvements to, protected natural or cultural resources + Substantial reduction of impact on natural or cultural resources + Results in a substantial improvement in sustainability	2
- Minimal impact on natural or cultural resources + Prevents minimal impact/results in minimal conservation of natural or cultural resources + Results in pollution prevention + Minimal reduction of impacts on natural or cultural resources + Results in minor improvement in sustainability	3
-/+ No impact on natural or cultural resources	4

Cost to NASA (Cost)[5]	Score
-/+ Net cost or benefit greater then $250,000	1
-/+ Net cost or benefit $100,000 to $250,000	2
-/+ Net cost or benefit $50,000 to $100,000	3
-/+ Net cost or benefit $0 to $50,000	4

Mission Impacts (MI)	Score
- Delay in mission-critical activity + Avoids delay in mission-critical activity	1
- No delay, but large cost to avoid delay + Prevents large cost related to avoiding a delay	2
- No delay, but minimal cost to avoid delay + Prevents a minimal cost related to avoiding a delay	3
-/+ No delay, no cost	4

Reputation and Stakeholder Relationship (R&S)	Score
- Major increase in negative public inquiries/mandatory meeting attendance + Major decrease in negative public inquiries/mandatory meeting attendance + Major increase in positive public inquiries	1
- Substantial adverse effect on NASA reputation or stakeholder relations + Substantial decrease in adverse effect /substantial positive effect on NASA reputation or stakeholder relations	2
- Minimal effect on NASA reputation or stakeholder relations + Minimal reduction in negative effect/minimal positive effect on NASA reputation or stakeholder relations	3
-/+ No effect on NASA reputation or stakeholder relations	4

Environmental Legal and Regulatory Implications (L&R)[6]	Score
- Any fine, consent agreement, unilateral order, or noncompliance with legal	1

- Any fine, consent agreement, unilateral order, or noncompliance with legal and other requirements + Avoids a fine, consent agreement, unilateral order, or noncompliance with legal and other requirements	1
- Notice of violation with no fine + Avoids a potential notice of violation with no fine + Eliminates a regulatory requirement + Results in regulatory relief	2
- Informal notice + Avoids an informal notice + Reduces a regulatory requirement	3
-/+ No regulatory action	4

[3] Safety and health relates to safety and health effects for individuals including those performing an environmental function (example: handling of hazardous waste).
[4] Natural and cultural resources include, but are not limited to, protected habitats and species, wetlands, and historic and archeological sites. Related impacts include excessive use of raw materials including energy and water or consumption, restoration and conservation of natural resources, or pollution prevention .
[5] The cost to NASA is the cost impact of not meeting the environmental requirement. For example, the "cost to NASA" of an oil spill would include the cost of cleaning up the spill and waste disposal, the cost of material replacement and downtime to the Center, and the cost of fines (if any). The benefit to NASA could be a cost avoided or revenue. For example, an avoided cost might be reduced permit fees, and revenue might be proceeds from a recycling program. Net costs or benefits consider compliance or operating costs, as well as revenue offsets.
[6] A consequence score of 1 includes both an externally or an internally identified noncompliance (that it is believed would have resulted in a fine if externally identified). A consequence of 2 or 3 recognizes the different degrees of external enforcement intensity that might exist. A reduced regulatory requirement is a requirement that is no longer applicable. An example would be the elimination of the need for a Title V air permit.

3.1.3.5 Step 5: Determine the environmental impact severity score for each category

a. For each environmental aspect, Centers shall use the environmental impact category table provided above to determine the lowest numerical severity score (greatest environmental impact) for each applicable environmental impact category, for each environmental impact.
b. Severity scores shall include the effect of management controls in place to mitigate environmental impacts or secure existing benefits.

3.1.3.6 Step 6: Determine the environmental impact frequency score for each category

a. For each environmental aspect, Centers shall assign a numerical probability-based frequency score to each environmental impact, using the applicable environmental impact categories and the potential frequency of occurrence of the environmental impact.
b. Frequency scores shall include the effect of management controls in place to mitigate environmental impacts or secure existing benefits.
c. Centers shall use the table below (taking into account the historical record of such an incident occurring) to determine the most probable frequency of the scenario occurring.
d. Assign the score that corresponds with the potential frequency of occurrence.

Score	Potential Frequency of Occurrence
1	Minimum of once a year
2	Minimum of once, greater than 1, up to 5 years
3	Minimum of once, greater than 5, up to 10 years
4	Minimum of once in 10+ years

3.1.3.7 Step 7: Determine overall risk ranking level

a. Centers shall determine the priority level of the associated environmental aspect based on the environmental impact severity versus frequency matrix illustrated in the figures below.

b. The overall, risk ranking for each aspect is determined by the risk associated with each environmental aspect, based on the most severe action priority category for its environmental impacts.

c. If contractor personnel conduct steps 1 through 6, the appropriate NASA authority personnel shall review and approve, modify, or reject the data, or request further analysis. The overall, risk ranking, determination shall be made by the appropriate NASA authority.

3.1.3.8 Step 8: Set objectives and targets

Centers shall determine which environmental aspects, associated with activities, products, and services, require objectives and targets as defined in Chapter 3.3.

3.2 Legal and Other Requirements

3.2.1 Purpose. To establish and maintain a procedure to identify all relevant legal and other requirements applicable to the environmental aspects of NASA's activities, products, and services.

3.2.2 Roles and Responsibilities

All roles and responsibilities in this Chapter are specific to relevant legal and other requirements applicable to the environmental aspects of NASA's activities, products, and services.

3.2.2.1 NASA Headquarters Environmental Management Division is responsible for

--

a. Evaluating Federal and State statutes, regulations, ordinances, and Executive orders that might apply to NASA.

b. Regularly updating information on Federal and State statutes, regulations, and Executive orders.

c. Ensuring that legal requirements information is communicated in a timely manner to the appropriate NASA Centers and Mission Directorates and Mission Support Offices.

d. Evaluating NASAwide agreements and commitments.

e. Consulting with the Office of General Counsel, as appropriate, in fulfilling responsibilities under Chapter 3.2.

3.2.2.2 NASA Mission Directorates and Mission Support Offices are responsible for --

a. Ensuring that program and project specific legal and other requirements are considered as appropriate within the Mission Directorate or Mission Support Office.

b. Ensuring applicable legal and other requirements are available to appropriate individuals within the Mission Directorate or Mission Support Office.

3.2.2.3 NASA Centers are responsible for --

a. a. Developing, implementing, and maintaining procedures for the evaluation of legal and other requirements and proposed changes to existing legal and other requirements for applicability to Center activities and operations.

b. b. Evaluating NASAwide and Center agreements and commitments.

c. c. Ensuring applicable legal and other requirements are available to appropriate individuals.

d. d. Providing information identified under step a. to Mission Directorates and Mission Support Offices when requested.

e. e. Consulting with their Office of Chief Counsel, as appropriate, in fulfilling responsibilities under Chapter 3.2.

3.3 Objectives and Targets

3.3.1 Purpose. To set forth requirements for establishing environmental objectives and targets that demonstrate commitment consistent with the intent of NASA environmental policy and the environmental aspects established through the EMS process.

3.3.2 Roles and Responsibilities

3.3.2.1 The Environmental and Energy Management Board is responsible for advising the NASA Operations Council on Agency and Headquarters objectives and targets.

3.3.2.2 NASA Headquarters Environmental Management Division is responsible for developing and maintaining

Headquarters and Agency level environmental objectives and targets in support of NASA environmental policy.

3.3.2.3 NASA Mission Directorates and Mission Support Offices are responsible for establishing and documenting, as appropriate, Mission Directorate, Mission Support Office or Center level objectives and targets within the limits of their authority.

3.3.2.4 NASA Centers are responsible for --

a. Establishing and maintaining documented Center objectives and targets consistent with high priority environmental aspects and NASA environmental policy.
b. Managing all other environmental aspects so that they do not become high priority environmental aspects. These do not require EMS defined objectives and targets.

3.3.3 Requirements

a. Objectives and targets shall be established at all appropriate organizational levels as needed for the implementation and maintenance of the EMS.
b. Objectives and targets shall be established to address high priority environmental aspects.
c. The determination of the need for objectives and targets shall be made by the appropriate NASA authority; however, the actual objectives and targets may be suggested by other interested parties.
d. When establishing objectives and targets each Center shall consider--

1. Legal and other requirements.
2. Available technology options and infrastructure.
3. Operational, mission, and mission-related activities.
4. Financial resources.
5. Interests and views of stakeholders.

e. Specific objectives and targets that are technically feasible and economically reasonable shall be established for high priority environmental aspects.
f. If the determination is made that a high priority environmental aspect cannot be addressed with one or more objectives and targets due to being technically infeasible or economically unreasonable, the rationale behind this determination shall be documented.
g. Objectives and targets may be established to address any medium, low, or very low priority environmental aspects that a Center determines it needs to manage or maintain to ensure they do not become a high priority.
h. Objectives and targets shall be reviewed and updated as appropriate.

3.4 Environmental Management Program(s)

3.4.1 Purpose. To establish and maintain Environmental Management Programs (EMPs) needed to manage NASA environmental policy and EMS objectives and targets, with EMPs setting the framework for, as needed, the development of training, communication, documentation, records, operational controls and other procedures and practices.

3.4.2 Roles and Responsibilities

3.4.2.1 NASA Headquarters Environmental Management Division is responsible for establishing and maintaining NASA environmental policy, requirements, and guidance.

3.4.2.2 NASA Mission Directorates and Mission Support Offices are responsible for establishing and maintaining new and/or revised documented EMPs within the limits of their authority.

3.4.2.3 NASA Centers are responsible for establishing and maintaining new and/or revised documented Center EMPs.

3.4.3 Requirements

a. All high priority environmental aspects shall be managed within the limits of technological feasibility and economic reasonableness.
b. Ensure that management controls are in place to: mitigate adverse environmental impacts or secure existing benefits, associated with non-high priority environmental aspects, and prevent those environmental aspects

from becoming high priority and manage NASA environmental policy and compliance activities. Controls shall remain in place unless it is determined that they are no longer required.

c. EMPs shall --

1. Designate responsibility for achieving objectives and targets at each relevant function and level of organization.
2. Demonstrate that NASA is addressing its identified objectives and targets.
3. Address major compliance activities if applicable.
4. Identify required resources (technical and financial) to carry out the EMPs.
5. Reflect changes in objectives and targets.
6. Establish the timeframes in which objectives and targets are to be achieved.

| TOC | Change_History | Preface | Chapter1 | Chapter2 | Chapter3 | Chapter4 | Chapter5 | Chapter6 | Chapter7 | AppendixA | AppendixB | AppendixC | AppendixZ1 | AppendixZ2 | AppendixZ3 | AppendixZ4 | ALL |

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